Governor's Water Augmentation Council: Finance Committee

May 15, 2017

Water Supply & Demand and Fiscal Opportunity Analysis for Water Augmentation Projects

Initial Research Questions from the Committee:

- Which Planning Areas have the most urgent imbalances?

- What are the costs to address these projected future imbalances through local augmentation projects?

- What is the water demand and projected imbalance for each Planning Area?

- Can we prioritize each Planning Area's water augmentation options by cost effectiveness and the Area's ability to pay?

Note: Staff should identify assumptions for each item.

Explanation of Metrics

- **Projected Total Balance or Imbalance for 2035 (Aquifer Surplus or Deficit in AF/YR)**

  This column lists estimated projected values for the total aquifer storage surplus or deficit of each planning area in 2035. This is measured in acre-feet per year. To arrive at these values, the following calculations were made:
  Total Annual Supply – Total projected demand for 2035 = Projected aquifer storage for 2035

  Where supply equals: (total annual natural and incidental recharge + total annual surface water supply + total reclaimed water supply + total Colorado River/CAP allocation, if applicable); and 2035 projections for demand and population were taken from the Final Report of the Water Resources Development Commission.

Explanation of Metrics (continued)

- **"Simplified Urgency Metric"**

  Urgency is defined as: temporal nearness to aquifer overdraft or depletion. For this metric, the projected aquifer imbalance is divided by the population of the planning area to provide an urgency metric that prioritizes the need for a water augmentation project. Values were then standardized on a scale of 0.0 to 1.0, with 1.0 being the most urgent.

$$\left[\frac{\text{Projected Imbalance}}{\text{Population}}\right] \Rightarrow \text{Standardized on scale of } \mathbf{0.0} \text{ to } \mathbf{1.0} \Rightarrow \text{Where } \mathbf{1} \text{ is the greatest urgency and } \mathbf{0} \text{ is the least}$$

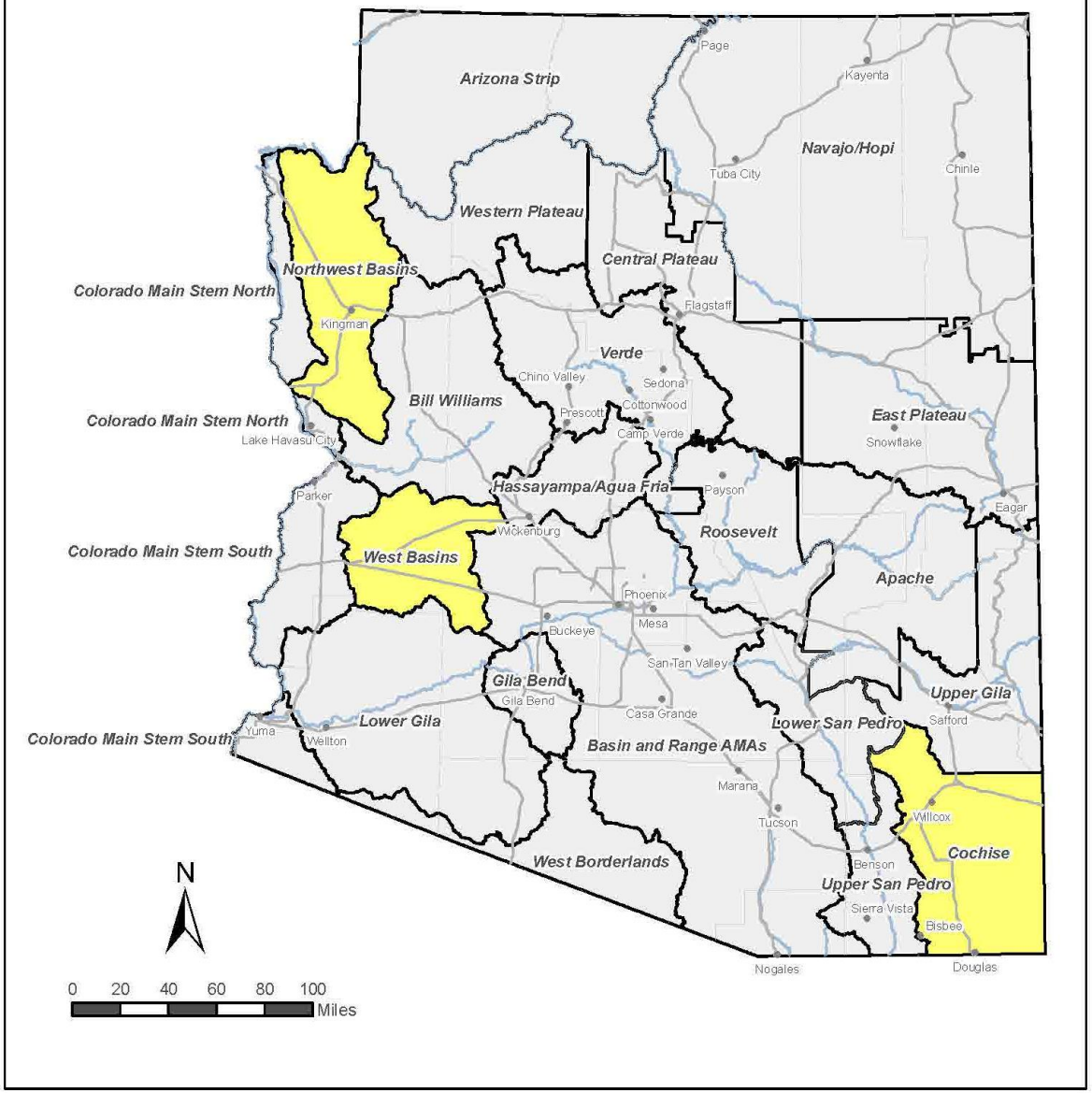
Explanation of Metrics (continued)

- **Metric of opportunity for water supply augmentation**

  Calculated by multiplying the Planning Area population with the Planning Area budget. This was calculated by summing the capital project funds and water/sewer budgets for the three largest municipalities and the appropriate counties *pro rata.*

  This number indicates the affordability of an augmentation project in a particular Planning Area that will make up for the projected imbalance in 2035.

[Planning Area budget * Population] → Standardized on scale of **0.0** to **1.0** → Where **1** is the greatest ability to pay



Arizona Water Initiative Planning Areas 2016

Legend

- Cities/Towns
- Streams
- Major Roads
- Planning Areas
- Counties

DATA SOURCE: WRDC & USGS

M&I

Planning Area	Projected Total Balance or Imbalance for 2035 (Aquifer Deficit or Surplus in AF/YR)	Simplified Urgency Metric	Metric of Fiscal Opportunity for Water Supply Augmentation
Basin and Range	-1,072,307	0.63	1.00
Northwest Basins	-26,087	0.65	0.20
Gila Bend	-25,964	1.00	0.04
Lower Gila	-12,614	0.71	0.09
Cochise	-11,210	0.64	0.04
West Basins	-6,102	0.73	0.01
Western Plateau	-1,133	0.67	0.01
Navajo/Hopi	428	0.60	0.88
Upper San Pedro	1,206	0.60	0.58
Low San Pedro	2,123	0.58	0.08
Central Plateau	2,141	0.60	0.80
East Plateau	2,327	0.60	0.43
Upper Gila	3,905	0.59	0.33
Hassayampa/Agua Fria	4,857	0.58	0.06
West Broderlands	5,255	0.48	0.01
Arizona Strip	16,278	0.45	0.01
Roosevelt	31,697	0.51	0.26
Bill Williams	32,619	0.00	0.01
Apache	41,595	0.38	0.08
Verde	54,473	0.57	1.00
Colorado Main Stem North	120,105	0.47	0.32
Colorado Main Stem South	310,225	0.42	0.01

DATA SOURCE: WRDC & USGS

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Planning Area	Projected Total Balance or Imbalance for 2035 (Aquifer Deficit or Surplus in AF/YR)	Simplified Urgency Metric	Metric of Fiscal Opportunity for Water Supply Augmentation
Basin and Range	-680,004	0.10	1.00
Gila Bend	-251,807	1.00	0.17
West Basins	-170,017	0.91	0.01
Cochise	-139,525	0.20	0.02
Lower Gila	-2,664	0.10	0.14
Northwest Basins	-782	0.09	0.01
Western Plateau	0	0.09	0.01
Central Plateau	204	0.09	0.01
Upper San Pedro	346	0.09	0.45
West Broderlands	1,697	0.08	0.02
Hassayampa/Agua Fria	1,820	0.09	0.02
Arizona Strip	2,254	0.09	0.01
East Plateau	2,273	0.09	0.41
Bill Williams	7,274	0.06	0.01
Navajo/Hopi	10,428	0.09	1.00
Upper Gila	20,607	0.08	0.14
Colorado Main Stem S	20,728	0.09	0.01
Verde	21,282	0.09	0.02
Low San Pedro	28,955	0.01	0.10
Roosevelt	53,843	0.05	0.29
Colorado Main Stem N	55,473	0.08	0.10
Apache	70,789	0.01	0.11

DATA SOURCE: WRDC & USGS

Totals

Planning Area	Projected Total Balance or Imbalance for 2035 (Aquifer Deficit in AF/YR)	Simplified Urgency Metric	Metric of Opportunity for Water Supply Augmenation
Basin and Range	-1752311	0.16	1.00
Gila Bend	-277,771	1.00	0.15
West Basins	-176,119	0.87	0.01
Cochise	-150,735	0.25	0.09
Northwest Basins	-26,869	0.16	0.23
Lower Gila	-15,278	0.18	0.11
Western Plateau	-1,133	0.16	0.00
Upper San Pedro	1,552	0.15	0.68
Central Plateau	2,345	0.15	0.94
East Plateau	4,601	0.15	0.50
Hassayampa/Agua Fria	6,677	0.14	0.07
West Borderlands	6,952	0.12	0.01
Navajo/Hopi	10,857	0.15	0.97
Arizona Strip	18,532	0.11	0.01
Upper Gila	24,513	0.13	0.34
Low San Pedro	31,078	0.08	0.07
Bill Williams	39,893	0.00	0.00
Verde	75,755	0.14	0.90
Roosevelt	85,540	0.10	0.20
Apache	112,385	0.02	0.06
N. Colorado Main Stem	175,578	0.11	0.21
S. Colorado Main Stem	330,953	0.11	0.07

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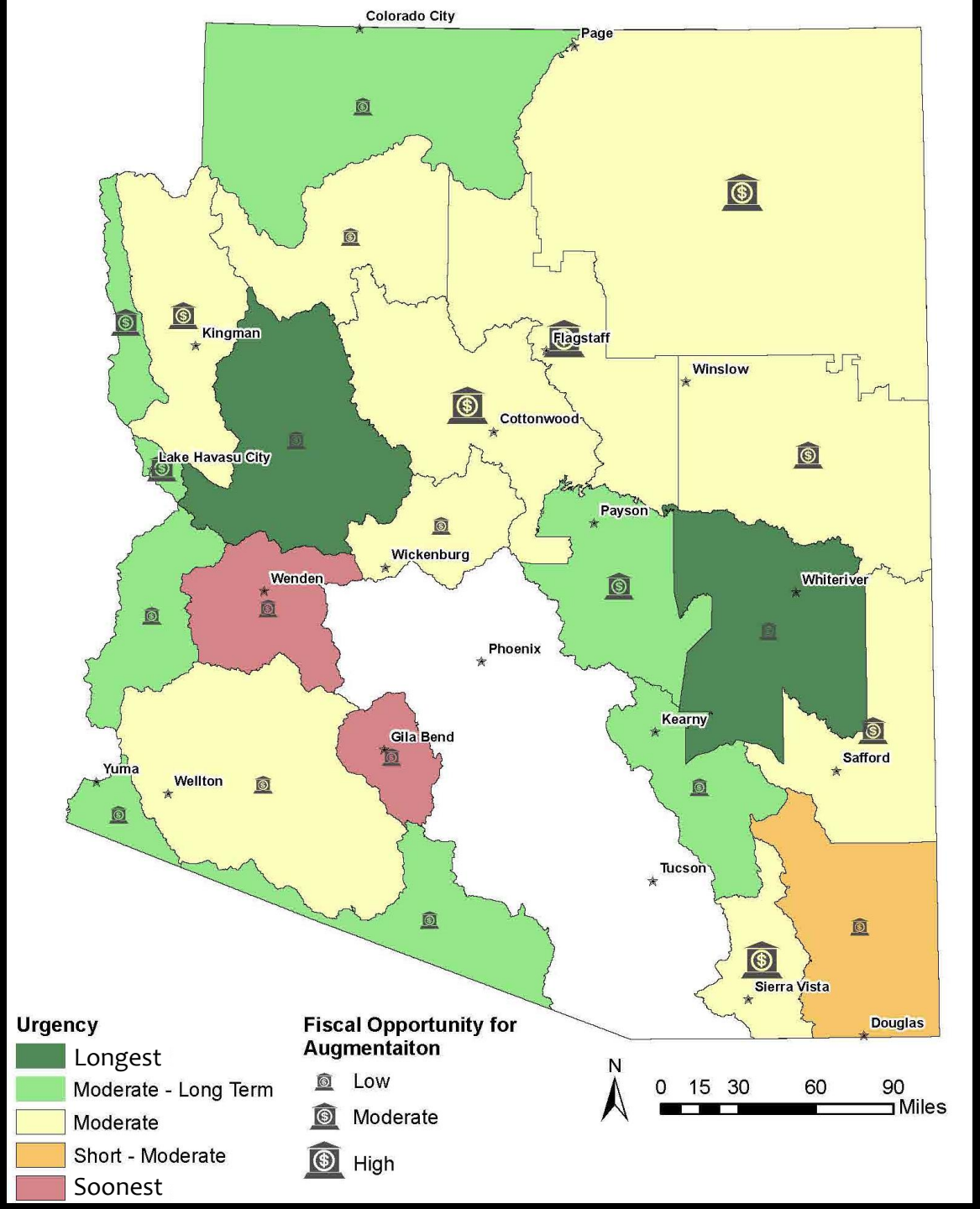

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Additional Assumptions

- **Data Sources:**
  - WRDC Supply and Demand Working Group Data
  - Arizona Water Atlas Aquifer Supply Data

- **Incidental recharge percent of total annual recharge**

  This was assumed to be 20% of the total annual recharge based on the following factors:

  For the Active Management Areas, we estimate that municipal incidental recharge is about 4%, industrial is 4-12% and agriculture is 20-50% but varies depending on the type of irrigation being used.

Data Summary Table

Planning Area	Projected Total Balance or Imbalance for 2035 (Aquifer Deficit in AF/YR)	Designated ranking number	Urgency Metric (Projected Imbalance/Population)	Simplified Urgency Metric	Current Est. Cost ($/AF) 2015	Planning Area Total Budget	Urgency Standardization (total budget)*(%non-AMApop)*(rank)	Metric of opportunity for water supply augmenation	Population 2016	population %
Gila Bend	-277,771	1	-31.61	1.00	103.87	$ 75,986,883	$ 525,567	0.15	8,788	0.7%
West Basins	-176,119	0.833	-26.83	0.87	143.65	$ 6,656,119	$ 23,861	0.01	6,564	0.5%
Cochise	-150,735	0.791	-3.75	0.25	108.60	$ 15,984,179	$ 316,426	0.09	40,171	3.2%
Northwest Basins	-26,869	0.588	-0.39	0.16	170.08	$ 44,277,169	$ 835,273	0.23	69,371	5.5%
Lower Gila	-15,278	0.569	-1.00	0.18	124.51	$ 101,811,019	$ 396,990	0.11	15,315	1.2%
Western Plateau	-1,133	0.546	-0.48	0.16	?	$ 792,020	$ 442	0.00	2,384	0.2%
Upper San Pedro	1,552	0.541	0.02	0.15	124.02	$ 117,207,150	$ 2,427,906	0.68	89,885	7.1%
Central Plateau	2,345	0.540	0.02	0.15	218.43	$ 152,736,283	$ 3,367,665	0.94	96,137	7.6%
East Plateau	4,601	0.536	0.05	0.15	156.62	$ 93,211,908	$ 1,789,109	0.50	84,850	6.7%
Hassayampa/Agua Fria	6,677	0.533	0.29	0.14	118.09	$ 47,960,009	$ 250,203	0.07	23,358	1.8%
West Borderlands	6,952	0.532	1.21	0.12	?	$ 41,690,422	$ 53,187	0.01	5,722	0.5%
Navajo/Hopi	10,857	0.526	0.09	0.15	157.32	$ 134,619,331	$ 3,473,826	0.97	118,577	9.3%
Arizona Strip	18,532	0.513	1.34	0.11	150.53	$ 11,926,755	$ 34,127	0.01	13,803	1.1%
Upper Gila	24,513	0.503	0.56	0.13	116.51	$ 140,404,916	$ 1,218,273	0.34	43,504	3.4%
Low San Pedro	31,078	0.493	2.63	0.08	111.19	$ 119,242,518	$ 268,612	0.07	11,794	0.9%
Bill Williams	39,893	0.478	5.51	0.00	173.31	$ 1,734,335	$ 2,258	0.00	7,237	0.6%
Verde	75,755	0.419	0.36	0.14	181.28	$ 122,812,282	$ 3,589,631	1.00	211,307	16.6%
Roosevelt	85,540	0.403	1.85	0.10	211.45	$ 124,109,851	$ 735,497	0.20	46,328	3.6%
Apache	112,385	0.359	4.59	0.02	?	$ 81,401,909	$ 202,108	0.06	24,470	1.9%
N. Colorado Main Stem	175,578	0.255	1.41	0.11	115.68	$ 116,637,021	$ 742,596	0.21	124,169	9.8%
S. Colorado Main Stem	330,953	0.100	1.46	0.11	108.51	$ 139,361,618	$ 248,859	0.07	226,898	17.9%